REMARKS

Claims 12, 14–20, and 22 are pending. Claim 20 is withdrawn.

Amendments to the Claims

Claim 12 has been amended to rewrite the optional components element in Markush format as suggested by the Examiner. Support for this amendment is provided, for example, in claim 12 as filed. The term "water" was removed from the group. Applicants submit that the amendment does not change the scope of the claim.

Claim 12 has been amended to incorporate the subject matter of claims 13 and 21. Claims 13 and 21 have been canceled without prejudice.

Claim Rejections for Obviousness-Type Double Patenting

Claims 12–22 stand provisionally rejected for obviousness-type double patenting over claims 1–11 of U.S. Patent Publication No. 2005/0045067 A1 (Naji). Applicants request the Examiner to hold this rejection in abeyance until a claim is found allowable.

Claim Rejections Under 35 U.S.C. § 103

A *prima facie* rejection for obviousness requires: (1) a disclosure or suggestion of every element of the claim in the cited reference or references; (2) a suggestion or motivation to modify or combine the references; and (3) a reasonable expectation of success. The suggestion to combine and the reasonable expectation of success must be found in the prior art or known to one skilled in the art. *In re* Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

As a preliminary matter, certain references cited by the Examiner do not disclose or suggest that the formulations disclosed therein are extrudable. The Examiner states that one of ordinary skill would understand that cement compositions may be extruded and that extrusion is done conventionally. Applicants first note that the Examiner has not cited a reference that discloses a motivation for one skilled in the art to extrude the formulations disclosed in the cited references, nor a reasonable expectation of success. References disclosing, for example, slurries and mortars are inapplicable absent a motivation and reasonable expectation of success, because, an known to those skilled in the art, cementitious formulations are not generically extrudable. Extrudable formulations are quite different from the disclosed formulations. For example, extrudable formulations are paste-like, unlike more fluid slurries, mortars, and self-leveling formulations cited. Extrudable formulations are also extrudable: that is, they possess

combinations of properties that permit extrusion, for example, viscosity, lubricity, green strength, dimensional stability, tearing, segregation, and the like. The Examiner has provided no reference or other evidence indicating that the formulations disclosed in these references are extrudable or could be modified to be extrudable. The Examiner also provides no motivation to modify these *particular* formulations into an extrudable formulation, or that such a modified formulation would be successfully extrudable. Accordingly, Applicants submit that the rejections over these references should be withdrawn.

Moreover, as discussed in the present specification, the present claims are directed to extrudable formulations that exhibit unexpected results. In the claimed formulations, the efficacy of the viscosity enhancing agent (VEA) is enhanced by the addition of a dispersion agent (DA). *See, e.g.*, Specification at 4:7–8 ("The applicant has found that by addition of a suitable dispersion agent, the efficacy of the viscosity enhancing agent can be increased."). None of the cited references discloses or suggests this synergistic effect between a VEA and DA in an extrudable formulation. As discussed in the specification, these synergies can provide at least three advantages in some preferred embodiments: (i) equivalent extrudability with a reduced dosage of VEA; (ii) equivalent extrudability using a lower grade of VEA; and/or (iii) improved extrudability using the same dosage of VEA. Specification at 4:8–16. As discussed in Examples 1, 2, and 4, even small decreases in the amount of VEA (as little as 0.2% in Table 5) provide significant cost savings. *See, e.g.*, Tables 3, 5, and 7. These Examples also demonstrate that adding a DA in some cases permits the use of a VEA that is otherwise unusable, for example, as shown in Tables 3 and 5, again, with significant cost savings. Because none of the references cited by the Examiner disclose or suggest this synergy, the claims are non-obvious over the art of record.

Rejections over Westhof. Claims 12 and 14–22 stand rejected as unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 5,254,228 (Westhof). Westhof appears to disclose a formulation useful as an overlay material for the anode in a cathodically protected, reinforced concrete structure. Westhof at 1:4–8. Amended claim 12 recites in relevant part, 0.3–5 wt% wt% VEA on a dry solids *of the cementitious material basis*. Applicants note that the formulation disclosed in Westhof includes only 0.06 wt% VEA on a dry solids *of the cementitious material basis*. Westhof at 4:38–46 (0.02% HPMC/33% Portland Cement). Because 0.06 wt% falls

outside of the range recited in amended claim 12, Applicants submit that the rejection of claim 12 is overcome for at least the reason that Westhof does not disclose or suggest every element recited in the claim. Because claims 14–20 and 22 are dependent on claim 12 and recite additional features, claims 14–20 and 22 are also not obvious over Westhof.

As discussed above, the formulation disclosed in Westhof is useful as an overlay material for the anode in a cathodically protected, reinforced concrete structure, and is therefore, applied over metal reinforcement. Westhof at 1:27–38. This formulation is a slurry, not an extrudable paste-like formulation, and as such, one skilled in the art would understand that Westhof does not disclose or suggest an extrudable formulation. Accordingly, one skilled in the art would have neither motivation nor reasonable expectation of success, and claims 12, 14–20, and 22 are also not obvious over Westhof for this reason.

Rejections over De Buen-Unna '077 or '605.

Claims 12–19 and 21–22 stand rejected as unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 6,660,077 B2 (De Buen-Unna '077) or U.S. Patent No. 6,824,605 B2 (De Buen-Unna '605). Because the disclosures of these two references appear to be substantially identical, all discussion concerning De Buen-Unna '605 are also equally applicable to De Buen-Unna '077.

Amended claim 12 recites in relevant part 0.05–0.5% by weight sulphonated DA on the basis of the weight of dry solids of cementitious material. De Buen-Unna '605 appears to disclose a range of 1.002–1.98 wt% of DAs on the basis of the weight of dry solids of cementitious material. De Buen-Unna '605 at 2:50–3:18 ((15.4% + 3.8%) × 10% and (13.4% + 3.3%) × 6%)). Because the range of sulphonated DA disclosed in De Buen-Unna '605 is well outside the range recited in amended claim 12, claim 12 is not obvious over De Buen-Unna '605 for at least this reason. Because claims 14–19 and 22 are dependent on claim 12 and recite additional features, claims 14–19 and 22 are also not obvious over De Buen-Unna '077 or De Buen-Unna '605 for the same reason.

Moreover De Buen-Unna '077 and De Buen-Unna '605 are directed to a formulation useful for manufacturing water permeable floors. De Buen-Unna '605 at 1:15–16. In some cases, the floor is reinforced with metal or plastic rods or mesh. De Buen-Unna '605 at 2:18–20. Those skilled in the art would understand that a water permeable floor is manufactured from a slurry formulation, not an extrudable formulation. Accordingly, one skilled in the art would not rely on

the disclosures De Buen-Unna '077 and/or De Buen-Unna '605 for an extrudable formulation, and neither reference provides either any motivation to modify to an extrudable formulation or any expectation of success in doing so. Consequently, claims 12, 14–19, and 22 are also not obvious over the cited references for this reason.

Rejections over Burgand. Claims 12–22 stand rejected as unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 5,403,394 (Burgand).

Burgand discloses a self-leveling cement comprising 18 parts of a self-leveling additive comprising 1 part of a water retention agent and 17 parts of formaldehyde based resin; and *3000* parts of a cement based material. Burgand at 2:36–54. Assuming for the sake of argument that the water retention agent is a VEA and the formaldehyde based resin is a DA, Burgand discloses a formulation with 0.033 wt% VEA and 0.567 wt% DA. In contrast, claim 12 recites 0.3–5% VEA and 0.05–0.5 wt% a sulphonated DA. Furthermore, the only formaldehyde based resin disclosed is formaldehyde melamine. Burgand at 2:29–30. Formaldehyde melamine is not sulphonated. Because Burgand does not disclose or suggest a sulphonated DA and because both components in the Burgand formulation fall outside the ranges recited in claim 12 with no suggestion to modify the ranges, claim 12 is not obvious over Burgand for at least this reason. Because claims 14–20 and 22 are dependent on claim 12 and recite additional features, claims 14–20 and 22 are also not obvious over Burgand for the same reason.

Moreover, Burgand is directed to a formulation that is best described as liquid or slurry: "Upon pouring the material onto the floor surface, the material begins flowing on its own accord to cover the floor surface." Burgand at 2:67–31. Note also the title of Burgand: "SELF-LEVELING FLOOR COATING MATERIAL." As discussed above, Burgand would provide one skilled in the art with no motivation or reasonable expectation of success that the disclosed formulation is extrudable. Accordingly, claims 12, 14–20, and 22 are also not obvious over Burgand for this reason.

Rejections over Pilgrim. Claim 12–22 stand rejected under 35 U.S.C. § 103(a) as unpatentable over GB 1 265 471 (Pilgrim). Claim 12 recites in relevant part a *sulphonated* dispersal agent. Pilgrim does not appear to disclose a sulphonated dispersal agent. In fact, Pilgrim does not appear to disclose a dispersion agent at all. Instead, the synthetic resin disclosed in Pilgrim is itself provided as a dispersion or aqueous solution, and is alleged to act as a lubricant

during extrusion and to improve the hardness of the final product. Pilgrim at 1:52–69. None of the disclosed resins is sulphonated: urea-formaldehyde, melamine-formaldehyde, polyvinyl acetate, polyacrylates, Versatic. Pilgrim at 1:83–96.

The Examiner refers to the statement "Modifying agents, such as cellulose ethers, which affect the water requirement of the mix can also be added." Pilgrim at 2:44–46. Pilgrim provides no guidance whatsoever as to the amount of cellulose ether in the formulation, and consequently, range of VEA recited in claim 12 is not *prima facie* obvious over this indefinite disclosure. For at least these reasons, claim 12 is not obvious over Pilgrim. Because claims 14–20 and 22 are dependent on claim 12 and recite additional features, claims 14–20 and 22 are also not obvious over Pilgrim.

Rejections over Fukuba. Claims 12–19 and 21–22 stand rejected as unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 4,102,697 (Fukuba). Fukuba provides "a fluid plaster composition capable of flowing with a low viscosity." Fukuba at 1:67–2:1. "The plaster composition of the invention shows a low viscosity of about 2000 cp or less." Fukuba at 2:10–11. Honey has a viscosity of about 2000–3000 cp. *See* http://www.research-equipment.com/viscosity%20chart.html. Honey is not extrudable. Fukuba simply does not disclose or suggest extrudable formulations. Because, Fukuba is irrelevant to extrudable formulations and one skilled in the art would not rely on it for the same, Fukuba provides no motivation to modify the disclosed fluid formulations into extrudable formulations, or a reasonable expectation of success. Accordingly, claims 12–19 and 21–22, all of which recite in relevant part an extrudable cementitious formulation are not obvious over Fukuba.

Rejections over McCurrich. Claims 12–22 stand rejected as unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 4,131,480 (McCurrich). Amended claim 12 recites in relevant part "0.3–5% by weight of dry solids of cementitious material of viscosity enhancing agent." Assuming for the sake of argument that the "gelling agent" of McCurrich (McCurrich at 1:45–48) corresponds to the recited viscosity enhancing agent, Examples 1–3 in McCurrich disclose 0.0453 wt%, 0.051 wt%, and 0.0544 wt% of hydroxyethyl cellulose based on the weight of the Portland cement, values that are outside of the claimed range. If one were to assume that these amounts fall within the preferred range of 0.008%–0.015% based on the total weight of the formulation, in the worst case, the 0.0453 wt% based on the weight of cement corresponds to

0.008% value, then 0.226 wt% based on cement would correspond to 0.04% based on the weight of the formulation, the greatest amount of VEA disclosed in McCurrich [0.0453 wt% × (0.04%/0.008%)]. This value also falls outside the range recited in claim 12. Because McCurrich does not disclose or suggest every element recited in claim 12, claim 12 is not obvious over McCurrich for at least this reason. Because claims 14–20 and 22 are dependent on claim 12 and recite additional features, claims 14–20 and 22 are also not obvious over McCurrich for at least the same reason.

The title of McCurrich is "PUMPABLE CEMENTITIOUS COMPOSITIONS." Accordingly, McCurrich is directed to slurries, not extrudable formulations. For the reasons provided above, claims 12, 14–20, and 22 are not obvious over McCurrich because McCurrich provides neither any motivation to modify to make an extrudable formulation, nor a reasonable expectation of success in doing so.

Rejections over Shin. Claims 12–19 and 21–22 stand rejected under 35 U.S.C. § 103(a) as unpatentable over KR 9508587 (Shin, abstract only). Amended claim 12 recites "0.05–0.5% by weight of dry solids of cementitious material of a sulphonated dispersion agent." Shin discloses a underwater cement composition comprising 0.6–5.0 parts melamine sulfonic acid or triazine plasticizer to 100 parts of cement. Accordingly, the melamine sulfonic acid falls outside the range recited in claim 12. Shin's range of the plasticizer spans 4.4%, all of which lies above the range recited in claim 12. Nothing in Shin would motivate one skilled in the art to reduce the amount of plasticizer to the recited range. Therefore, claim 12 is not obvious over Shin. Because claims 14–19 and 22 are dependent on claim 12 and recite additional features, these claims are also not obvious over Shin for at least the same reason.

Shin discloses an underwater cement. Underwater cements are mortars or slurries, not extrudable pastes. For the reasons discussed above, one skilled in the art would not rely on Shin for an extrudable formulation. Because Shin provides no motivation to modify or a reasonable expectation of success, claims 12, 14–19 and 22 are not obvious over Shin for this reason.

Rejections over Schermann. Claims 12–19 and 21–22 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 5,470,383 (Schermann). Schermann discloses a thickener for building products. Schermann at Abstract. Schermann does not disclose or suggest extrusion. Of the building products disclosed, none appears to be an extrudable cementitious

formulation: knifing fillers such as plaster knifing fillers, adhesives such as cement tile adhesives, polymer rendering, jointing compositions, machine rendering such as plaster/lime machine rendering and other products of this type. Schermann at 6:44–48. As discussed above, one skilled in the art would not rely on Schermann because it provides no motivation to modify or expectation of success for an extrudable formulation. Accordingly, claims 12, 14–19, and 22 are not obvious over Schermann.

Rejections over Dingsøyr. Claims 12–22 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 4,935,060 (Dingsøyr). Dingsøyr appears to disclose a hydraulic cement slurry useful for cementation of oil wells. Dingsøyr at 1:6–8. Dingsøyr does not disclose an extrudable formulation. Indeed, the title of the reference is "HYDRAULIC CEMENT SLURRY." Dingsøyr does not provide a motivation to modify the reference or reasonable expectation of success for an extrudable formulation. Accordingly, claims 12, 14–20, and 22 are not obvious over Dingsøyr.

Furthermore, the components alleged to correspond to the DA and VEA are both optional (0–12% thinner, 0–8% fluid loss additive). Dingsøyr at 3:7–19. A review of the formulations disclosed in Tables I and IV confirms this: formulations A, D, G, and L do not use a thinner; formulations H, I, K, and L do not use a retarder. Nothing in Dingsøyr points to the quantities of DA and VEA recited in the claims. The rheologies and compressive strengths of the formulations do not appear to correlate with either or both of the thinner and fluid loss additive, and the specification does not appear to prefer any particular amount of either component. For this reason, Dingsøyr provides no motivation to modify the disclosed formulation to the proportions recited in the claims or any reasonable expectation of success. Dingsøyr does not disclose or suggest the synergistic effect between the VEA and DA discussed above. Accordingly, claims 12, 14–20, and 22 are not obvious over Dingsøyr.

Rejections over Debus. Claims 12–22 stand rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 4,265,674 (Debus). Debus appears to disclose an additive for concrete and mortar comprising a cellulose ether and a non-ionic, low foaming surface active agent. Amended claim 12 recites "0.05–0.5% by weight of dry solids of cementitious material of a sulphonated dispersion agent." The non-ionic, low foaming surface active agent disclosed in Debus does not appear to be a sulphonated dispersion agent. *See, e.g.*, Debus at 4:58–5:11.

Debus does disclose that a German publication discloses a pumpable formulation comprising a dispersing agent, a gelling agent, and an optional plasticizer. Debus at 2:66–3:10. The quantities of the dispersing and gelling agents in the finished mixture are 0.001–0.04% wt%, which is outside of the ranges of the VEA and DA recited in the pending claims. Debus at 3:2–5. Accordingly, Debus does not disclose or suggest every element recited in claim 12, and consequently, claim 12 is not obvious over Debus for at least this reason. Because claims 13–22 are dependent on claim 12 and recite additional features, these claims are also not obvious over Debus.

Debus also does not disclose or suggest an extrudable formulation. In fact, Debus teaches against an extrudable formulation, stating that a sticky consistency in a concrete or mortar "detracts from the pumpability thereof." Debus at 3:58–66. Accordingly, Debus is directed to pumpable formulations, which as discussed above, are not extrudable. For these reasons, Debus provides no motivation to modify the disclosed slurry formulations into extrudable formulations, and no reasonable expectation of success. Consequently, claim 12–22 are also non-obvious over Debus for this reason.

Rejections over Cheriton. Claims 12, 14–19, and 21–22 stand rejected as unpatentable under 35 U.S.C. § 103(a) over U.S. Patent No. 4,394,175 (Cheriton). Cheriton appears to disclose a self-leveling cementitious mix. As discussed above, claim 12 has been amended to incorporate the subject matter of claim 13. Because the Examiner states that Cheriton does not teach ranges overlapping those of claim 13 and did not reject claim 13 over Cheriton, Applicants submit that amended claim 12 is allowable over Cheriton.

Claim Rejections Under 35 U.S.C. § 112, Second Paragraph

Claims 12–22 stand rejected under 35 U.S.C. § 112, second paragraph, as indefinite.

Claim 12 is objected to as reciting "water" as an optional component. Claim 12 has been amended to no longer list water among the optional components. Claim 12 also been amended to recite the optional components in Markush format as suggested by the Examiner.

The Examiner objects to the term "density modifier" in claim 12 as vague. The specification on page 9, lines 12–17 provides that density modifying additives are useful for producing low density composite articles and provides as examples perlite, vermiculite, low density calcium silicate hydrate, ceramic hollow spheres, and fly-ash. Accordingly, Applicants

submit that the term "density modifier" in claim 12 would be clear to one skilled in the art in light of the disclosure.

In claim 20, the term "acrylic based polymer" is objected to as vague. Applicants submit that one skilled in the art would understand the term to mean a polymer based on acrylic monomers.

The term "type" in claim 21 is objected to as indefinite. Because claim 21 has been canceled the objection is moot.

Withdrawn Claim 20

Applicants request the Examiner rejoin withdrawn claim 20 should claim 12 be found allowable. Claim 20 was withdrawn pursuant to an election of species requirement. Claim 12 is generic.

Applicants submit that all of the Examiner's rejections have been overcome. If the Examiner believes that a conversation with the Applicants' attorney would advance prosecution, the Examiner is invited to contact the undersigned. Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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